

ÄKTAbasic

**Routine purification of proteins,
peptides and nucleic acids.**

**Reproducible, reliable day-to-day
performance**

Easy-start, control and evaluation

**Accurate, reproducible flow rates
and gradients**

- 0.001–10 ml/min, 0–25 MPa
- 0.01–100 ml/min, 0–10 MPa

**High sensitivity, multiple wavelength
detection**

- 3 wavelengths simultaneously
- wavelength range 190–700 nm

ÄKTAdesign service

Introduction

ÄKTATMbasic chromatography systems (Fig 1 and Fig 2) are part of ÄKTATMdesign, a range of high performance liquid chromatography systems for academic and industrial research laboratories. Each ÄKTAdesign system meets specific chromatographic needs for purification, characterization and analysis of proteins, peptides, oligonucleotides and nucleic acids.

UNICORNTM is the control, evaluation and reporting platform for ÄKTAdesign systems which ensures quick and simple communication between systems and users.

UNICORN is designed for WindowsTM 2000/XP and includes an option for network control of multiple systems.

ÄKTATMbasic systems ensure a fast and easy start to any separation:

- automatic self-diagnostic test and calibration occurs at every start-up
- the Xenon lamp is ready for immediate use
- method wizard for easy programming



Fig 1. ÄKTAbasic system.



Fig 2. ÄKTAbasic 10 XT includes Autosampler A-900.

All wetted materials are inert, fully biocompatible and resistant to all eluents commonly used in liquid chromatography, ensuring high recovery, no loss of biological activity and easy cleaning.

Reproducible, reliable, day-to-day performance

All components and functions in ÄKTAbasic systems are optimized to ensure reproducible separations (Fig 3).

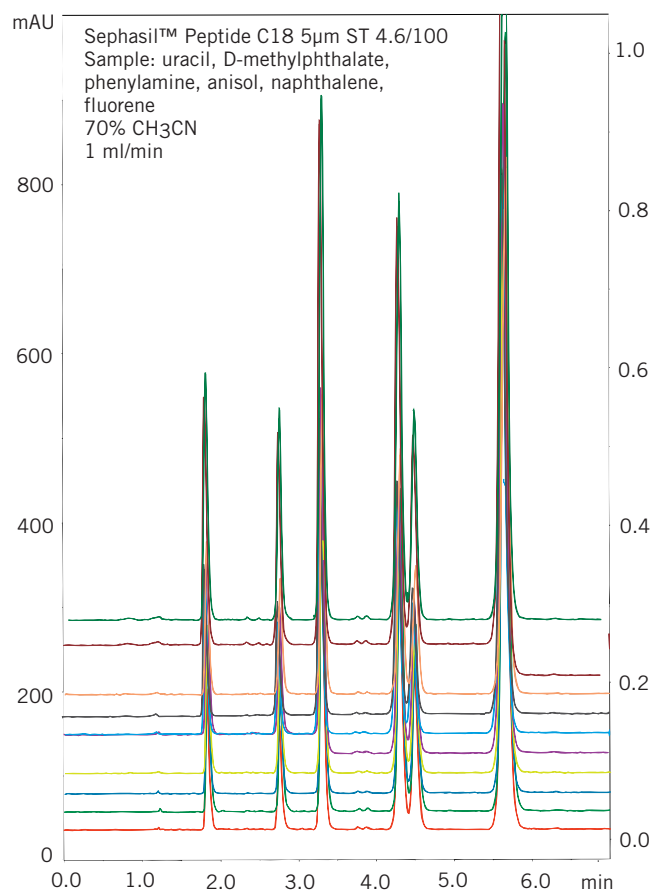


Fig 3. Excellent reproducibility of repeated injections on ÄKTAbasic 10 XT.

For accuracy and reliability from day to day, each instrument automatically performs a self-diagnostic test and calibrates appropriate settings at every start-up. Figure 4 shows the high resolution and day-to-day reproducibility of results.

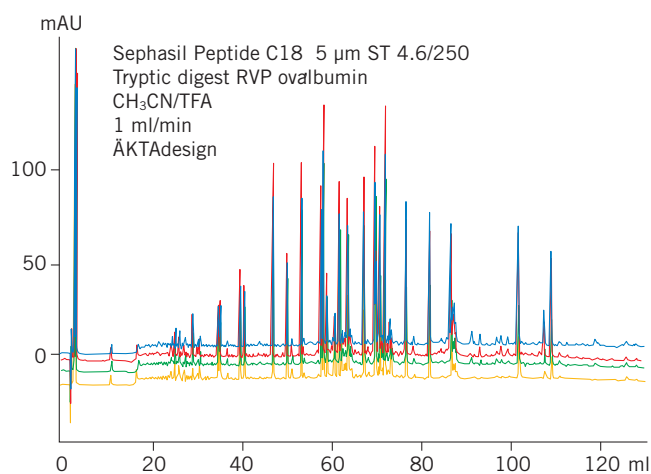


Fig 4. High resolution, reproducible results from day to day.

Easy-start control and evaluation – UNICORN

UNICORN is a control, evaluation and reporting system to ensure quick and simple communication between all ÄKTAdesign systems and users. All instrument settings and functions are under direct control of UNICORN. Figure 5 shows how fast you can start an existing method and the simplicity of programming ÄKTAbasic using the method wizard.

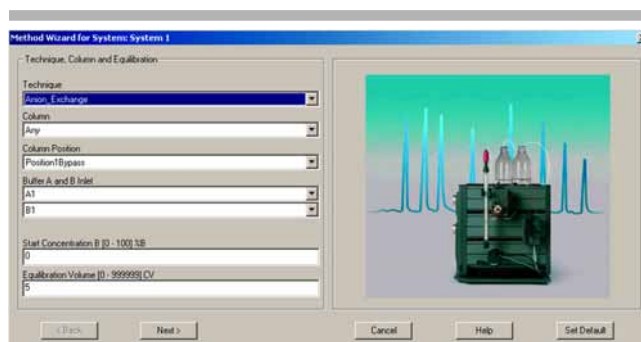


Fig 5. Simple, direct start for every run.

The method wizard provides a unique combination of flow configuration and methods support for all chromatographic techniques:

- Gel filtration (size exclusion) chromatography
- Anion exchange chromatography
- Cation exchange chromatography
- Hydrophobic interaction chromatography
- Affinity chromatography
- Reversed phase chromatography

UNICORN control system is used from laboratory to full-scale production and fulfills the stringent control and data handling procedures of modern laboratories (Fig 6).

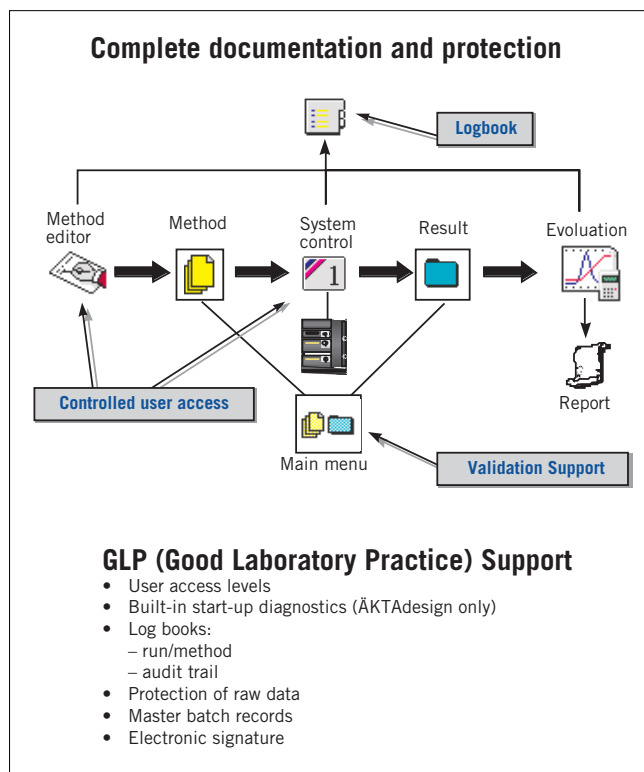


Fig 6. UNICORN fulfills control and data handling procedures of modern laboratories.

Figure 7 shows typical results with customized reports from ÅKTA basic 10 system. In this example the molecular weight of an unknown molecule is estimated using gel filtration and UNICORN analysis module. This analysis module can be added to UNICORN evaluation and offers:

- Quantification by internal or external standards
- Determination of molecular weight by gel filtration
- Quantification of sample amount and sample concentration
- Recovery calculations

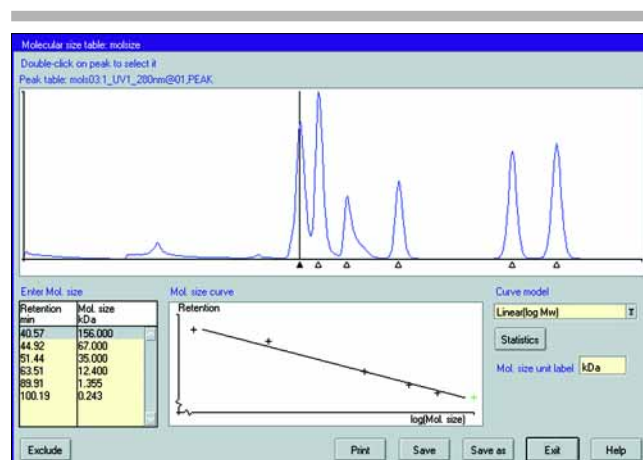


Fig 7A. Creation of a standard curve for molecular weight determination using gel filtration.

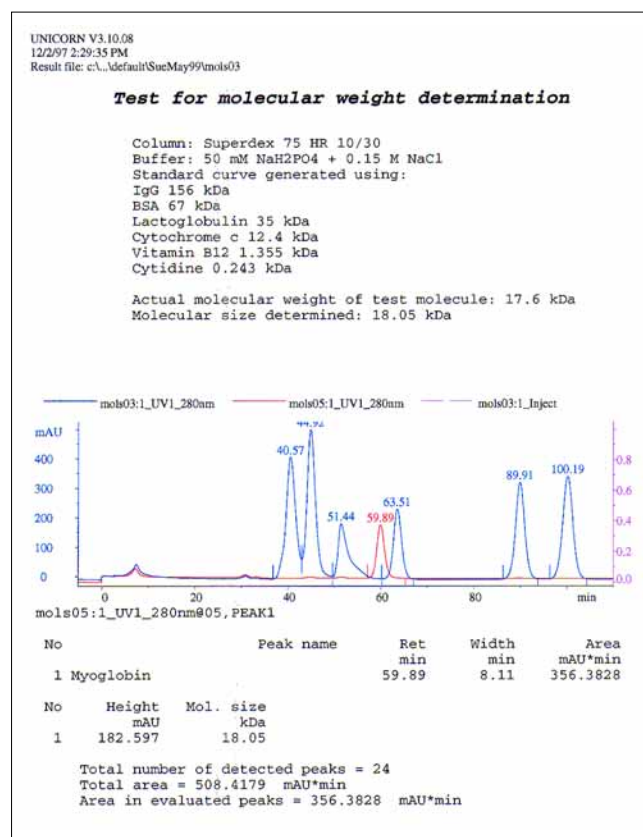


Fig 7B. Customized report generation.

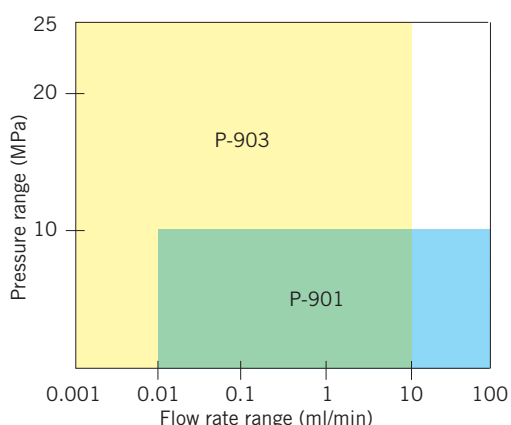


Fig 8. Flow rates and pressure ranges of P-900 pumps.

Accurate, reproducible flow rates and gradients – Pump P-900 series

P-900 pumps are high performance binary gradient pumps designed to meet the needs of all chromatographers working with biomolecules. Figure 8 shows the pressure and flow rate ranges covered by the two pumps.

A unique new pump design overcomes many of the problems associated with traditional HPLC pumps to provide accurate, reproducible flow and gradient formation, over the entire flow rate range, independent of back pressure. Communication, gradient control and pressure monitoring are handled by the main control unit. Binary gradients with high pressure mixing are controlled by the pump itself. Each pump piston is driven individually by a microprocessor controlled stepper motor system. This direct control of simple mechanics enables automatic adjustments for pump synchronization, mix volume, compressibility changes and check valve positions, to be made at every working point over the entire flow rate range.

Figures 9 and 10 demonstrate the excellent flow rate accuracy and gradient formation achieved by this unique new design.

High sensitivity, multiple wavelength detection – Monitor UV-900

Monitor UV-900 is a high sensitivity multi-wavelength UV-Vis monitor, suitable for use from analytical to preparative scale. The monitor records up to three wavelengths simultaneously for optimum detection.

To ensure high sensitivity and resolution dead volumes between column and detector are eliminated by positioning the column directly on to the monitor flow cell (Fig 11).

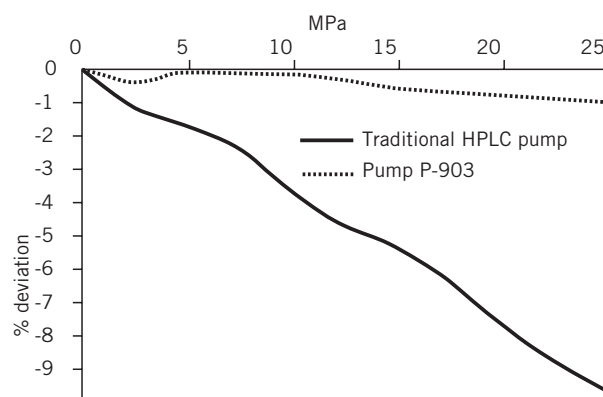


Fig 9. Flow rate accuracy across pressure range of Pump P-903 compared to a traditional HPLC pump.

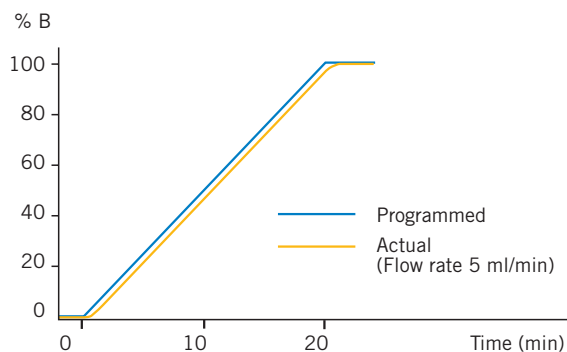


Fig 10. Comparison of actual gradient to theoretical gradient over the entire gradient range of Pump P-901.

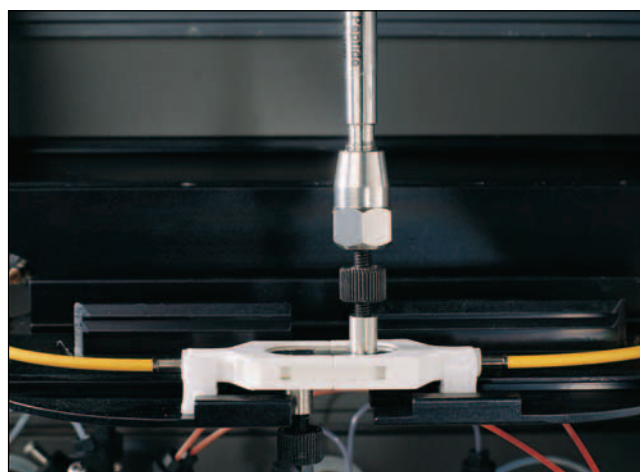


Fig 11. Columns connected directly to flow cell.

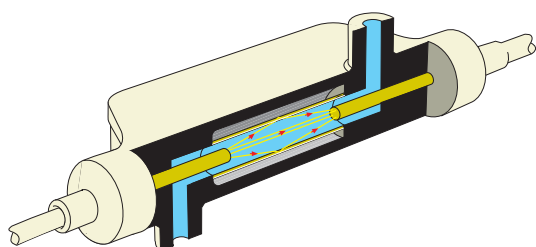


Fig 12. Unique flow cell design and fiber optic technology ensure a high signal to noise ratio.

A unique combination of fibre optic technology with a new flow cell design (Fig 12) ensures a high signal-to-noise ratio for maximum performance. Maintenance costs are minimized by use of a unique Xenon flash lamp, giving a significant increase in lamp lifetime compared to conventional deuterium lamps.

ÄKTAdesign service

- Controlled costs
- Traceable results
- Support for regulatory requirements
- Maximum productivity
- Continuous operation at optimal performance

Regular, planned maintenance increases productivity by keeping a system in top working condition and minimising downtime. A service support agreement allows users to budget for all service and maintenance costs, gives full cost

ÄKTAbasic system configuration

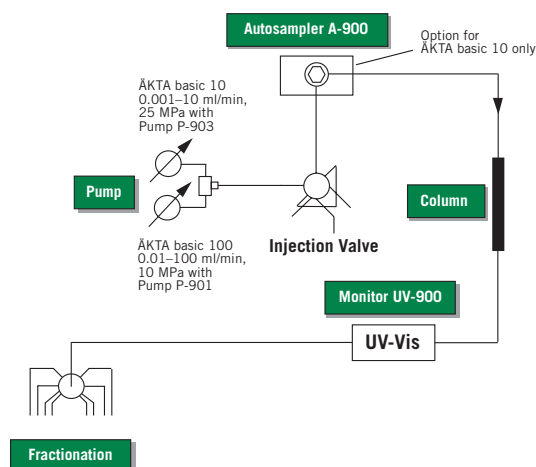


Fig 13. Example of an ÄKTAbasic configuration.

control and eliminates unexpected expenses. Service support agreements greatly simplify compliance with regulatory and quality demands. Scheduled preventive maintenance carried out by qualified engineers using traceable test equipment and the in-built service diagnostics of ÄKTAdesign, provide users with support to meet the requirements of Good Laboratory Practice (GLP).

ÄKTAbasic chromatography systems

ÄKTAbasic chromatography systems are supplied fully assembled and tested. Figure 13 shows the standard system configurations and Figure 14 gives an overview of the main system and the optional components.

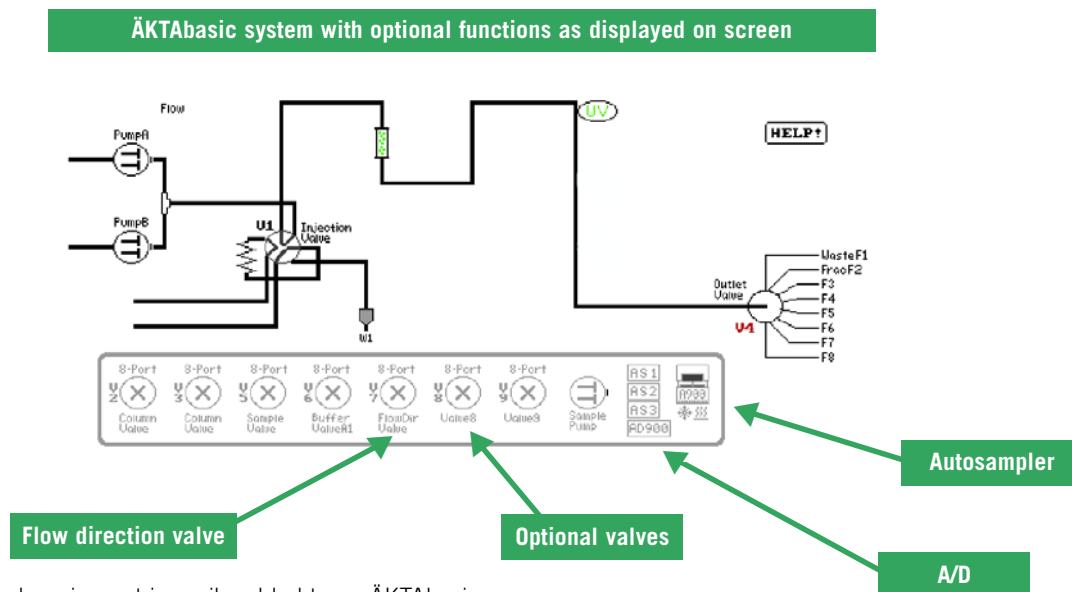


Fig 14. Additional equipment is easily added to an ÄKTAbasic.

ÄKTAdesign Components

UNICORN control system

UNICORN is installed on the PC prior to delivery and controls ÄKTAdesign instruments.

For further information on the latest version of UNICORN control system and computer recommendations, please contact your local Amersham Biosciences representative.

Operating Data

Computer requirement

Pentium II/333 MHz or later (minimum Pentium/90 MHz)
One system: 64 Mb RAM (minimum 32 Mb)
Two or more systems: 92 Mb RAM (minimum 64 Mb)
1 Gb available hard disk (150 Mb to run UNICORN),
NTFS file system

Colour monitor, 1024 × 768 with 64 k colours
1 ISA slot/connected system
Mouse
CD-ROM drive
1.44 Mb (3.5") diskette drive

Software requirements for UNICORN 4.0

Windows 2000/XP.

Network requirements

Supported network cards: 3COM Etherlink III
Compaq™ Netelligent 10/100 TX Embedded UTP Controller
Compaq Integrated NetFlex-3 Controller
AMD PCNET PCI Ethernet Adapter (Integrated)
Novell™ NetWare™ version 4.50.819 or later, alternatively
Windows NT Server 4.0
A valid network connection

Valves

ÄKTAbasic systems have one seven-port injection valve as standard, INV-907, for sample application.

Sample application

- fixed volume (100 µl–2 ml) or partial loop fill (>100 µl)
- Superloop™ 10 ml, Superloop 50 ml, Superloop 150 ml for samples 1–10 ml, 1–50 ml, 1–150 ml respectively
- via system pump or sample pump P-950, for larger volumes.

Mixer

Mixer M-925 is a dynamic, single chamber mixer powered and controlled from Pump P-901 or P-903.

Mixing chambers

0.6 ml supplied with ÄKTAbasic 10 systems
2 ml supplied with ÄKTAbasic 100

Pump P-901 – the wide flow rate range is ideal for both laboratory and pilot-scale applications, running at optimal flow rates without changing pump modules or pump heads. A low dead volume, which minimizes sample dilution, makes Pump P-901 suitable for application of large sample volumes.

Further information: Please ask for Pump P-900 series
Data File No. 18-1119-49.

Pressure range	0–10 MPa (100 bar, 1450 psi)
Flow rate range settings	
isocratic mode:	0.01–100 ml/min
Increment	0.01 ml/min
Internal volume	< 1800 µl/pump module
Pressure limits	programmable upper and lower limit
Viscosity maximum	5cP

Pump P-903 – the flow rates and pressure specifications are ideal for running laboratory scale separations and high resolution analyses. A low dead volume, which minimizes sample dilution, makes Pump P-903 suitable for application of larger sample volumes.

Further information: Please ask for Pump P-900 series
Data File No. 18-1119-49.

Pressure range	0–25 MPa (250 bar, 3625 psi)
Flow rate range settings	
isocratic mode:	0.001–10 ml/min
Increment	0.001 ml/min
Internal volume	< 600 µl/pump module
Pressure limits	programmable upper and lower limit
Viscosity maximum	5cP

Monitor UV-900

Monitor UV-900 is a high sensitivity multiwavelength UV-Vis monitor, recording up to three wavelengths simultaneously for optimum detection.

Further information: Please ask for Monitor UV-900
Data File No. 18-1111-17.

Wavelength range	190–700 nm in steps of 1 nm, 3 wavelengths simultaneously
Bandwidth	4 nm
Wavelength accuracy	±2 nm
Wavelength reproducibility	±0.01 nm
Linearity	< 2% deviation up to 2 AU at 260 nm with Uracil at pH 2)
Noise* (at 230 nm)	< 6 × 10 ⁻⁵ AU

* Measured with water at 1 ml/min, time constant 1 s, 10 mm flow cell.

	Drift (at 254 nm) Max. pressure Flow cells:	$< 2 \times 10^{-4}$ AU/h 2 MPa (20 bar, 290 psi) optical pathlength 2 mm, internal volume 2 μ l, delivered with ÄKTAbasic 100 optical pathlength 10 mm, internal volume 9 μ l, delivered with ÄKTAbasic 10
Fraction collector Frac-950 (optional) Frac-950 offers two independent ways to prevent sample loss, and the highest flexibility in the choice of collection mode. Using volume or time mode, different fraction sizes can be collected during different stages of a separation. Automatic peak fractionation, based on peak detection using slope or level sensing, minimizes peak dilution and cross-contamination. Event marks correlate the fractions with the chromatogram. A recycle function enables collection from repetitive runs. Further information: Please ask for Frac-950 Data File No. 18-1153-57.	Flow rate range Fraction capacity Rack A Rack B Rack C Rack D Rack E Rack F Rack G Prep Mode	0.001–100 ml/min 120 \times 18 mm tubes 8 \times 30 mm tubes 240 \times 12 mm tubes 4 microplates (4 \times 96 wells per plate) 8 \times 30 mm tubes 45 \times 30 mm tubes 80 \times 30 mm tubes 20 \times 250 ml vessels 30 funnels Conversion Kit
Fraction collector Frac-901 (optional) Fractionation using Frac-901 is performed by fixed volume collection or automatic peak fractionation. Peak fractionation can be based on peak detection using slope or level sensing. Fraction marks and fraction numbers allow easy identification of fractions and peaks. A PV-908 selection valve is required for flow diversion to waste.	Tube capacity	95 in Tube Rack 18 mm (10–18 mm diameter tubes) 175 in Tube Rack 12 mm (optional) 40 in Tube Rack 30 mm (optional)
Autosampler A-900 Autosampler A-900 comes in two versions: with or without Peltier cooling, and increases system throughput by allowing pre-programmed automatic sample injection. Control of the autosampler is through UNICORN control system. Further information: Please ask for Autosampler A-900 Data File No. 18-1152-89.	Sample capacity Injection volume Injection valve switch time Precision Full loop injections Partial loopfill injections μ l pick-up injections Sample viscosity Autosampler A-900 with Cooling only Cooling capacity Typical cooling times	96 standard vials (1.5ml) 160 micro vials (0.5 ml) 5–1000 μ l, flushed loop 1–500 μ l, partial loop fill 1–475 μ l, pick up < 100 msec rsd \leq 0.3% rsd \leq 0.5% for injection volumes > 5 μ l rsd \leq 1.0% for injection volume > 5 μ l 0–10 cP >11.5 °C below ambient temperature (T) for 16 °C < T < 40 °C 34 min from 23 °C to 4 °C (at 45% relative humidity) 60 min from 32 °C to 4 °C (at 35% relative humidity)
Analog/digital converter AD-900 AD-900 is an analog/digital converter for connecting an external instrument to the UNICORN control system in an ÄKTAdesign system. The module has one high-resolution analog input for monitoring e.g. pressure, UV monitor signals, or other signals available as voltage outputs.	Analog/digital Converter AD-900 Voltage range Resolution Input impedance Accuracy Max. input voltage Power requirement Dimensions incl. attachment (W \times D \times H) Weight	\pm 2V DC 1 μ V, 20 bit \geq 1 M Ω > \pm 0.5 % or \pm 0.05 mV \pm 5 V 18–36 DC through the UniNet 2 connection 45 \times 175 \times 85 mm 0.4 kg

Ordering information

Product	Code No.
ÄKTAbasic 10 (fraction collector not included) Computer*	18-1401-00

ÄKTAbasic 100 (fraction collector not included) Computer*	18-1405-00
---	------------

* Your local Amersham Biosciences representative will provide details of the fully installed computer to be supplied with the system.

Frac-950 fraction collector complete with Rack A OR	18-6083-00
--	------------

Frac-901 fraction collector complete with 18 mm tube rack	18-1118-97
Outlet valve PV-908 (one PV-908 must be ordered with every Frac-901)	18-1108-41

Autosampler A-900 OR	18-1116-61
--------------------------------	------------

Autosampler A-900 , cooled version (both include 200 x 1.5 ml sample vials and caps)	18-1144-61
--	------------

ÄKTAdesign XT kit includes tubing and UNICORN analysis module	18-6083-19
---	------------

Air sensors

Air-900 control box, includes one UniNet 2 cable, (controls up to 3 air sensors)	18-1121-22
Purge valve (required for buffer inlet position only)	18-1126-33
Air sensor Air-925 (2.5 mm i.d.)	18-1121-24
Air sensor Air-912 (1.2 mm i.d.)	18-1121-23

Optional function valves e.g. for reverse flow, flow diversions (up to 3 valves of any type)

INV-907, including one UniNet cable	18-1108-40
IV-908, including one UniNet cable	18-1108-42
PV-908, including one UniNet cable	18-1108-41

Sample application

Superloop™ 10 ml (ÄKTAdesign), load 1–10 ml	18-1113-81
Superloop 50 ml (ÄKTAdesign), load 1–50 ml	18-1113-82
Superloop 150 ml, load 1–150 ml (requires union 1/16" female – M6 male fitting, code no. 18-1112-57)	18-1023-85

Additional items

UNICORN analysis module	18-1134-74
AD-900, including a UniNet cable 0,7 m, a Mini-DIN cable 1.5 m	18-1148-62

Related product literature

Product	Code No.
Data Files	
ÄKTAFPLC™	18-1128-41
ÄKTApurifier™	18-1119-48
ÄKTAEplorer™ Systems	18-1124-09
ÄKTAprime™	18-1136-91
Monitor UV-900	18-1111-17
Pump P-900 Series	18-1119-49
Monitor pH/C-900	18-1111-19
Fraction Collector Frac-950	18-1153-57
Autosampler A-900	18-1152-89

www.chromatography.amershambiosciences.com

For further information:

Asia Pacific Tel: +852 2811 8693 Fax: +852 2811 5251 **Australasia** Tel: +61 2 9899 0999 Fax: +61 2 9899 7511 **Austria** Tel: 01 57 606 16 19 Fax: 01 57 606 16 27 **Belgium** Tel: 0800 73 888 Fax: 03 272 1637 **Canada** Tel: 1 800 463 5800 Fax: 1 800 567 1008 **Central, East, South East Europe** Tel: +43 1 982 3826 Fax: +43 1 985 8327 **Denmark** Tel: 45 16 2400 Fax: 45 16 2424 **Finland & Baltics** Tel: +358 (0)9 512 3940 Fax: +358 (0)9 512 1710 **France** Tel: 0169 35 67 00 Fax: 0169 41 9677 **Germany** Tel: 0761 4903 490 Fax: 0761 4903 405 **Italy** Tel: 02 27322 1 Fax: 02 27302 212 **Japan** Tel: 81 3 5331 9336 Fax: 81 3 5331 9370 **Latin America** Tel: +55 11 3933 7300 Fax: +55 11 3933 7306 **Middle East and Africa** Tel: +30 2 10 96 00 687 Fax: +30 2 10 96 00 693 **Netherlands** Tel: 0165 580 410 Fax: 0165 580 401 **Norway** Tel: 2318 5800 Fax: 2318 6800 **Portugal** Tel: 21 417 7035 Fax: 21 417 3184 **Russian & other C.I.S. & N.I.S.** Tel: +7 (095) 232 0250, 956 1137 Fax: +7 (095) 230 6377 **South East Asia** Tel: 60 3 8024 2080 Fax: 60 3 8024 2090 **Spain** Tel: 93 594 49 50 Fax: 93 594 49 55 **Sweden** Tel: 018 612 19 00 Fax: 018 612 19 10 **Switzerland** Tel: 0848 8028 12 Fax: 0848 8028 13 **UK** Tel: 0800 616 928 Fax: 0800 616 927 **USA** Tel: +1 800 526 3593 Fax: +1 877 295 8102

ÄKTA, ÄKTAFPLC, ÄKTAbasic, ÄKTApurifier, ÄKTAEplorer, ÄKTAprime, UNICORN, Superloop and Drop Design are trademarks of Amersham Biosciences Limited. Amersham and Amersham Biosciences are trademarks of Amersham plc. Windows is a trademark of Microsoft Corporation. Compaq is a trademark of Compaq Computer Corporation. Novell and Netware are trademarks of Novell Inc. Frac-950 is covered by US patent 6450218. All goods and services are sold subject to the terms and conditions of sale of the company within the Amersham Biosciences group that supplies them. A copy of these terms and conditions is available on request. **Amersham Biosciences UK Limited**, Amersham Place, Little Chalfont, Buckinghamshire HP7 9NA, England. **Amersham Biosciences AB**, Björkgatan 30, SE-751 84 Uppsala, Sweden. **Amersham Biosciences Corp.**, 800 Centennial Avenue, PO Box 1327, Piscataway NJ 08855, USA. **Amersham Biosciences Europe GmbH**, Munzinger Strasse 9, D-79111 Freiburg, Germany. **Amersham Biosciences KK**, Sanken Bldg. 3-25-1, Hyakunincho Amersham Shinjuku-ku, Tokyo 169-0073, Japan.

© Amersham Biosciences AB 2003 – All rights reserved.